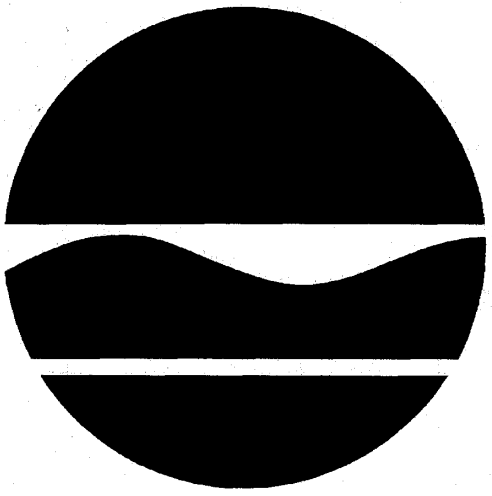
Fumex Sanitation

Garden City Park, Nassau County,
New York
Site No. 1-30-041

PROPOSED REMEDIAL ACTION PLAN

February 2001



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental
Conservation

PROPOSED REMEDIAL ACTION PLAN

FUMEX SANITATION
Village of Garden City Park, Town of North Hempstead,
Nassau County, New York
Site No. 130041
February 2001

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at Fumex Sanitation, a class 2 inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, spills and spray application of pesticides have resulted in the disposal of hazardous wastes, including alpha chlordane, gamma chlordane and heptachlor, at the site. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a significant threat to human health associated with the potential for direct contact with contaminated soils.
- contaminated soils at the site have acted as a source of contamination to local groundwater, a sole source aquifer, and are therefore a significant threat to the environment.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous wastes disposed at the Fumex Sanitation site have caused, the following remedy (Alternative 3) is proposed:

- Excavation of the top 18 inches of soil from the entire parking lot in the rear of the Fumex building and the contaminated surface soils in the yard of an adjacent residence;
- Disposal of the excavated material to an off-site Resource Conservation and Recovery Act (RCRA) approved facility;
- Backfill of the excavated area with clean soil;
- Removal of an on-site drywell and replacement with a catch basin connected to a local storm drain;
- Installation and long term maintenance of an impermeable membrane cap;

- A deed restriction to maintain the impermeable cap and restrict any soil excavation beneath the impermeable cap;

- Power washing (with detergent) of the concrete floor in the former garage area of the on-site building, with collection and disposal of the water generated; and

- Implementation of a groundwater monitoring program.

This remedy would remove the most contaminated soil near the surface, thus preventing direct human contact. The catch basin and impermeable membrane cap would minimize the potential for the remaining contamination to impact groundwater quality.

The proposed remedy (Alternative 3), discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Proposed Remedial Action Plan (PRAP), in conformity with applicable standards, criteria, and guidance (SCGs).

This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in greater detail in the Remedial Investigation (RI), Feasibility Study (FS) and other relevant reports and documents, available at the document repositories.

To better understand the site and the investigations conducted, the public is encouraged to review the project documents at the following repositories:

Shelter Rock Public Library
165 Searingtown Road
Albertson, New York 11507
(516) 248-7363
Hours: Mon, Tues, Thurs 10-9, Weds 2-9, Fri 10-6, Sat 9-5, Sun 1-5

NYSDEC Reg. 1
SUNY - Building 40
Stony Brook, NY 11790
(631) 444-0240
Hours: M-F 8:30am-4:45pm

NYSDEC
Division of Environmental Remediation
Bureau of Eastern Remedial Action, Rm. 242
50 Wolf Road
Albany, NY 12233-7010
Robert Filkins - Project Manager
(518) 457-7924
Hours: M-F 8:30am - 4:45pm

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 16, 2001 through March 19, 2001 to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for March 7, 2001 at the Jackson Avenue Elementary School,

300 Jackson Avenue, Mineola, NY beginning at 7:00.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which you can submit verbal or written comments on the PRAP.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision. The Record of Decision is the NYSDEC's final selection of the remedy for this site. Written comments may be sent to Mr. Filkins at the above address through March 19, 2001.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Fumex Sanitation inactive hazardous waste disposal site is a parcel approximately 1/3 acre in size at 131 Herricks Road in the Village of Garden City Park, Town of North Hempstead, Nassau County (see Figure 1). The site is on the corner of Herricks Road and Bedford Avenue. The area around the site is mixed residential and commercial/light industrial in nature. On the site is a one story brick building with a paved parking area in the rear.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Fumex Sanitation operated a commercial termite extermination business at this location from 1952 to 1992. Reportedly, the unpaved parking lot was regularly sprayed with chlordane from 1952 to 1978 for insect control. The parking lot was paved sometime between 1978 and 1981. In 1981, a spill of less than 30 gallons of chlordane rinse water occurred onto the asphalt parking lot. Some of the rinse water entered a dry well within the Fumex parking lot. Due to these activities, chlordane and other pesticides contaminated the soil and the groundwater beneath the site, and the surface soil of a neighboring yard.

3.2: Remedial History

In 1986, the NYSDEC entered into an Order-On-Consent with Fumex Sanitation, Inc. in which Fumex agreed to conduct an investigation to determine the extent of contamination in the soil and groundwater at the site. During the resulting investigation soil samples were taken at various depths during the construction of five monitoring wells. The wells were installed in the rear parking area within 30 feet of the dry well. Chlordane was found in all the soil samples taken, at concentrations up to 1500 parts per billion (ppb). The least contaminated soil sample, taken at the greatest depth, 50 to 52 feet below the ground surface, had 59 ppb of chlordane. For comparison, the current NYSDEC Recommended Soil Cleanup Objective for chlordane (Technical Administrative Guidance Memorandum 4046) is 540 ppb.

Groundwater samples taken from each of the five shallow on-site monitoring wells

contained chlordane in excess of groundwater standards. Concentrations of chlordane ranged from 0.89 ppb to 99.7 ppb. The current groundwater standard for chlordane is 0.05 ppb.

A second site investigation was conducted in 1989 to develop a preliminary Hazard Ranking System score for the site. In March 1990, the site was listed as a class 2 on New York State's registry of inactive hazardous waste disposal sites. A class 2 site is one which presents a significant threat to public health or the environment.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health or the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in 2 phases. The first phase was conducted between January 1996 and December 1996 the second phase between February 1997 and January 2000. A report entitled Fumex Sanitation Site Final Phase II Remedial Investigation Report (January 2000) has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- *Soil samples were collected from on-site borings to determine contamination levels at various depths beneath the site;*
- *Shallow and deep monitoring wells were installed to evaluate on-site and off-site groundwater;*
- *A survey of area water supply wells, both public and private, and existing monitoring wells was conducted;*
- *Surface soil samples were taken from an adjacent residential property; and*
- *Wipe samples were taken from the former garage area of the on-site building.*

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Fumex Sanitation site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup objectives for the protection of groundwater, background conditions, and health-based exposure scenarios. NYSDOH has developed a site specific soil cleanup level for chlordane of 1400ppb for the off-site residential soils impacted by this site. In addition, for soils, site specific background concentration levels can be considered for certain classes of contaminants.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

Beneath the Fumex Sanitation site are approximately 800 feet of unconsolidated deposits overlying crystalline bedrock. The shallowest soils beneath the site are the Upper Glacial formation. The Upper Glacial formation consists of Pleistocene age outwash sands and gravels and is approximately 100 feet thick in the vicinity of the Fumex Sanitation site. The depth to groundwater is approximately 40 to 50 feet below grade. Shallow groundwater flow is generally to the southwest (see Figure 2). Immediately beneath the Upper Glacial formation is the Magothy formation. The Magothy is composed of sands with intermittent clay layers and is 300 to 400 feet thick in the vicinity of the site. The Magothy formation is used as the primary aquifer for public drinking water in Nassau County, with most wells screened 300-400 feet below the water table. Beneath the Magothy formation is the Raritan formation, consisting of the Raritan clay and the Lloyd sand. The Raritan formation is approximately 300 feet thick and overlies bedrock.

4.1.2: Nature of Contamination

As described in the RI report, many soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. The category of contaminants which exceed their SCGs are pesticides. The most significant contaminants of concern are chlordane, heptachlor, dieldrin, and heptachlor epoxide.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Surface and shallow soil samples were taken at six on-site and eight off-site locations during the Remedial Investigation. These six locations are the boring for monitoring well MW-6 and five soil borings. At the six on-site locations, seven soil samples were taken in the first foot of soil beneath the asphalt parking lot. All seven of these samples, taken at widely separated locations throughout the parking lot (See Figure 3), greatly exceeded recommended soil cleanup objective for various pesticides. (See Figure 4)

The greatest shallow soil contamination was found in the surface (immediately below pavement) sample from soil boring SB-12, which contained 51,000 ppb of heptachlor, 510 times the recommended soil cleanup objective of 100 ppb. Chlordane was also present at 280,000 ppb, or 518 times the cleanup objective of 540 ppb. Dieldrin was

present at 15,000 ppb, which is 341 times the cleanup objective of 44 ppb.

The least contaminated shallow on-site soil sample was taken from the 0-1 foot interval during the installation of monitoring well MW-6. This sample contained contamination that was over 50 times the cleanup objective for heptachlor, dieldrin and chlordane. The concentration of heptachlor in this sample was 4800 ppb, dieldrin was 3500 ppb, and chlordane was 35000 ppb.

These results indicate that shallow soil pesticide contamination exists throughout the entire rear parking area. This conclusion is consistent with reports of the historical spraying of the lot with pesticides for insect control.

Contamination in subsurface soils generally decreased significantly with depth. One notable exception was the MW-6 boring, where dieldrin concentrations at a depth of 10-12 feet were 386 times the soil cleanup objectives. Chlordane and heptachlor concentrations at that depth were also much higher than in the shallow soil samples from the MW-6 boring. At several locations pesticide concentrations increased again slightly to as much as 10 times soil cleanup objectives in the 45-47 foot sample, located just above the water table.

In October, 1999 two composite soil samples, EB and WB, were taken from the residential property that borders the Fumex site to the west, and both were analyzed for pesticides. One of these composite samples, taken from the eastern boundary (nearest Fumex) of the residential property contained a chlordane concentration of 6,800 ppb. This is 5 times the 1400 ppb off-site chlordane cleanup level identified for this site by NYSDOH.

Additional soil samples were taken from adjacent, off-site properties in September 2000. Surface soil samples were taken from three locations on the residential property immediately west of the Fumex site where pesticide contamination had previously been found. Only one of these three soil samples exceeded soil cleanup objectives. Surface soil sample SS-2 contained 3400 ppb of chlordane, or 2.4 times the NYSDOH soil cleanup level. Three other surface soil samples taken from properties adjoining the Fumex site to the south did not exceed soil cleanup objectives.

Groundwater

Six on-site and eight off-site groundwater monitoring wells were installed during the RI and previous investigations of this site (See Figures 2 and 3). There are five shallow and one deep monitoring wells on-site. Off-site there are five shallow and three deep monitoring wells. The shallow wells are approximately 50 feet deep and the deep wells are approximately 125 feet deep.

Each of the five shallow on-site monitoring wells (MW-1,2,3,4&5) were contaminated with several pesticides at concentrations above groundwater standards (See Table 2). The highest concentration of chlordane in on-site groundwater was 34 ppb in a June, 1998 sample from MW-1. This concentration is 680 times the groundwater standard of 0.05 ppb. The highest concentration of dieldrin in groundwater was 5.2 ppb in the September 1998 sample from MW-1. That concentration is 1300 times the groundwater standard of 0.004 ppb.

The highest concentration of heptachlor in groundwater was found in the March 1996 sample from MW-5. This sample contained 0.5 ppb of heptachlor, 12 times the groundwater standard of 0.04 ppb. The highest concentration of heptachlor epoxide in groundwater was found in the March 1996 sample from MW-2. This sample contained 0.61 ppb of heptachlor epoxide, 20 times the groundwater standard of 0.03 ppb.

The other monitoring well on-site is MW-6, a deep well. The only contaminant found in groundwater from this well was chlordane at 0.057 ppb, just above the groundwater standard and a much lower concentration than in the shallow wells on-site.

The only contaminant found in groundwater from any of the 8 off-site wells was dieldrin at 0.03 ppb in MW-9S. MW-9S is a shallow well upgradient of the site. The contamination to this well likely came from a pesticide application at a building nearby.

Based on the lack of groundwater contamination in off-site monitoring well MW-10, which is approximately 25 feet downgradient of the site (see Figure 3), on-site pesticide contamination in groundwater does not appear to be migrating from the site. This is likely due to the extremely low solubility of most pesticides in water and the affinity pesticides have to adsorb to soil particles.

Wipe Samples

Three surface wipe samples were taken from the former garage area of the on-site building in September 2000. The results indicated 6300 nanograms and 2300 nanograms of chlordane/100 square centimeters from the wipe samples taken on the floor, and 87 nanograms of chlordane/100 square centimeters from the wipe sample taken on a wall. These levels are low and do not present a significant health risk to persons at the site.

4.2: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 2.3 of the FS report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may potentially exist at the site include:

- A potential contamination exposure pathway is direct contact with or ingestion of contaminants in surface or subsurface soils. On-site surface soils are covered by asphalt and surrounded by walls and fences making it unlikely for anyone, particularly children, to ingest or come into contact with those soils. More plausible is for workers to come in contact with or accidentally ingest small quantities of contaminated soil during any future excavation on-site.

The off-site contamination in the yard of a neighboring residence presents the risk of a completed exposure pathway. Children or adults residing in or visiting this property could come in contact with or ingest the contaminated surface soils;

- A second potential contaminant exposure pathway is the consumption of groundwater from a public or private water supply well that has been impacted by site contaminants. A survey of public and private water supply wells did not show any private drinking water supply wells within 1000 feet of the site. The closest downgradient public water supply well is 6,300 feet away and is monitored regularly for contamination, as mandated by NYS regulations. An assessment of contaminant movement in groundwater indicates that site contaminants would have traveled less than 100 feet from the site, assuming they originally entered the groundwater in 1952. No groundwater contamination from the site has been detected in any of the off-site monitoring wells. Therefore, it is considered highly unlikely for this potential route of exposure to be completed; and

- Another potential exposure pathway is direct contact with contaminated surfaces inside the building. Concentrations of these pesticides are low, and pressure washing and sealing these surfaces would be sufficient to eliminate the exposure pathway.

4.3: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The following pathways for environmental exposure and/or ecological risks have been identified:

- There is a significant threat to the environment associated with the environmental damage to a groundwater resource. Pesticide contamination from the site affects groundwater beneath the site, impacting its value as a sole source aquifer; and

- The off-site contamination in the yard of a neighboring residence is potentially accessible to wildlife such as birds, insects and burrowing animals. However, as the area of this off-site contamination appears to be small, no significant impacts are anticipated.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Parties (PRP) for the site, documented to date, include: Fumex

Sanitation Inc., S.S. Sanitation, and Steven Schwimmer.

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Eliminate the risk of ingestion of groundwater affected by the site that does not attain NYSDOH Standards for Public Drinking Water Supplies and NYSDEC Class GA Ambient Water Quality Criteria;*
- *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria;*
- *Eliminate exposures to site contaminants in surface and subsurface soils;*
- *Remove all soils with chlordane concentrations greater than 1400 ppb from impacted residential properties;*
- *Eliminate, to the extent practicable, further migration of contaminants from the soil into the groundwater; and*
- *Eliminate exposures to residual pesticide contamination on the interior surfaces of the on-site building.*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Fumex Sanitation site were identified, screened and evaluated in the report entitled Fumex Sanitation Site Feasibility Study Report.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site.

Alternative 1: No Action

Present Worth:	*$ 136,000*
Capital Cost:	*$ 14,800*
Annual O&M:	*$ 7,900*
Time to Implement	*3 months*

The No Action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. This alternative includes land use controls to minimize site development and limit exposure to affected soil, access restrictions with physical barriers and warning signs, well permit regulations to restrict potential public exposure, and a 30 year semiannual groundwater monitoring program. Capital costs are for the installation and maintenance of fencing and warning signs.

Alternative 2: Drywell Removal and Associated Surface Runoff Basin and Drain Installation, Repair of Existing Asphalt Surface, and Groundwater and Site Monitoring

Present Worth:	*$ 294,000*
Capital Cost:	*$ 140,000*
Annual O&M:	*$ 10,000*
Time to Implement	*3 months*

This alternative does not involve the excavation of surface or subsurface soils. Under this alternative, human and environmental exposures would be minimized by the partial removal of the source of contamination via drywell removal and replacement with a catch basin and storm drain connection. The repair of the parking lot asphalt surface to patch all cracks and fissures would reduce groundwater impact from infiltration and surface runoff. The new catch basin and drain would divert runoff water into a local storm drain. The concrete floor in the former garage area of the on-site building would be power washed with detergent and the surface sealed. The washwater would be collected and properly disposed of off-site. A 30 year semi-annual groundwater monitoring program and a site monitoring program to observe changes in site conditions, including inspection of the asphalt surface, would be implemented. Institutional controls would be put in place requiring NYSDEC approval before any future development of the parking area.

Alternative 3: Excavation of All Surface Soil, Drywell Removal and Associated Surface Runoff Basin and Drain Installation, Impermeable Cap, and Groundwater Monitoring

Present Worth:	*$ 628,000*
Capital Cost:	*$ 464,000*
Annual O&M:	*$ 10,700*
Time to Implement	*3-6 months*

This alternative includes excavation of the 18 inches of soil immediately beneath the asphalt over the entire parking area. The volume of these soils is estimated to be 350 cubic yards. The excavated material would then be transported to an off-site RCRA-approved landfill for disposal. The on-site drywell

would be removed and replaced with a catch basin connected to a local storm drain as in Alternative 2. During the removal of the drywell some additional soils would also be removed from immediately beneath the drywell to the extent practical. A 40 mil (0.04 inch thick) polyvinyl chloride membrane would then be installed at the bottom of the excavation, covered by a geotextile material. The excavation would then be backfilled with clean soil, a six inch gravel layer, and finally an asphalt cover. Contaminated soils above NYSDOH soil cleanup levels of 1400 ppb would be removed from the neighboring residence and transported to an off-site, RCRA-approved landfill for disposal. The volume of the soil to be removed from the residential property would be determined during the design of the remedy. The concrete floor in the former garage area of the on-site building would be power washed with detergent and the surface sealed. The washwater would be collected and properly disposed of off-site. A 30 year semiannual groundwater monitoring program would be implemented. Institutional controls would be put in place requiring NYSDEC approval before any future excavation or development of the parking area.

Alternative 4: Excavation of All Surface Soil, Excavation of the Drywell Trench Area, Drywell Removal and Associated Surface Runoff Basin and Drain Installation, Impermeable Cap, and Groundwater Monitoring

Present Worth:	*$ 1,395,000*
Capital Cost:	*$ 1,238,000*
Annual O&M:	*$ 10,200*
Time to Implement	*3-6 months*

This alternative is the same as Alternative 3 with an additional excavation trench running from the area of SB-11, through the vicinity of the drywell, to the area of MW-6. This trench would be approximately 20 feet wide and 60 feet long, and would reach a depth of approximately 20 feet near SB-11, 25 feet near the drywell, and 15 feet near MW-6. Sampling results from the RI indicate that subsurface soils significantly exceed recommended soil cleanup standards in these areas. Contaminated soils above NYSDOH soil cleanup levels of 1400 ppb would be removed from the neighboring residence and transported to an off-site, RCRA-approved landfill for disposal. The volume of the soil to be removed from the residential property would be determined during the design of the remedy. The concrete floor in the former garage area of the on-site building would be power washed with detergent and the surface sealed. The washwater would be collected and properly disposed of. A 30 year semiannual groundwater monitoring program would be implemented. Institutional controls would be put in place requiring NYSDEC approval before any future excavation or development of the parking area.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The most applicable SCGs at the Fumex Sanitation site are the groundwater standards defined in NYSDEC's Division of Water Technical and Operational Guidance Series 1.1.1 and the recommended soil cleanup objectives defined in NYSDEC's Division of Environmental Remediation Technical and Guidance Memorandum (TAGM), HWR-94-4046.

Alternative 1 would not include any active remediation and would not result in compliance with SCGs for soil and groundwater.

Alternative 2 would not address the SCG for soil since the existing affected soils remain in the surface and subsurface. This alternative would not remediate any of the groundwater currently in violation of SCGs. However, this alternative would reduce the potential for further groundwater contamination by abandonment of the drywell and repair or repaving of the parking area. These actions would reduce the percolation of surface runoff water through the affected soil and into groundwater thus reducing the future contamination of the groundwater. As a result, if proper maintenance is performed on the asphalt and catch basin, Alternative 2 could potentially comply with groundwater SCGs in the future. This would be confirmed by long term monitoring.

Alternative 3 would address soil SCGs by removal of surface soil throughout the parking area, and all contaminated soil from the adjacent residential property. Soils above the recommended cleanup objective would still remain on-site in the subsurface, but would be covered by a cap. The cap would cover the entire area of impacted soils on-site which would mitigate any health concerns with direct contact and provide protection of groundwater. Alternative 3 would eliminate the potential for direct contact with subsurface soil by covering those soils with an impermeable cap and 18 inches of clean soil. The impermeable cap would protect groundwater by preventing infiltration of surface runoff water from percolating through the contaminated subsurface soils to the aquifer.

Groundwater SCGs would not immediately be met by Alternative 3 since no remediation of the groundwater already in violation of standards is included. However, the impermeable cap would prevent further contamination and further improve compliance with the groundwater SCG in the future. This would be confirmed by long term monitoring

Alternative 4, like Alternative 3, would address soil SCGs by removal of all contaminated soils from the adjacent residential property, removal of surface soil throughout the parking area and capping the entire area of impacted soils on-site. However, under Alternative 4 the most contaminated subsurface soil would also be

removed. Some subsurface soil above SCGs would still remain.

Groundwater SCGs would not immediately be met by Alternative 4 since no remediation of the groundwater already in violation of standards is included. However, the impermeable cap would prevent further contamination and further improve compliance with the groundwater SCG in the future. This would be confirmed by long term monitoring.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Under Alternative 1 institutional controls consisting of warning signs and fences around the site property boundary would have a limited ability to protect human health. No actions would be undertaken to protect the environment, therefore the site would continue to be a significant threat to the environment.

The ability of Alternative 2 to protect human health would be greater than Alternative 1, but still limited. Replacement of the drywell with a surface runoff basin and asphalt pavement repair would somewhat reduce the already low risk associated with future impacts to groundwater, and therefore also reduce further damage the environment by contamination of a sole source aquifer. The maintenance of the asphalt would also slightly reduce the risk of direct contact with contaminated soils by repair of any breaks that would expose contaminated soils.

Alternative 3 would reduce the already limited risk posed by groundwater contamination by preventing further contamination, and therefore also reduce further damage to the environment by contamination of a sole source aquifer. The risk of direct human contact with soils would be greatly reduced by removing the top 18 inches of contaminated soil and replacing it with clean fill.

Similar to Alternative 3, Alternative 4 would reduce the already limited risk posed by groundwater contamination by preventing further contamination, and therefore also reduce further damage to the environment by contamination of a sole source aquifer. The risk of direct human contact with soils would be greatly reduced by removing the top 18 inches of contaminated soil and replacing it with clean fill. Additional protection would be provided in the case of a future excavation by the removal of the highest concentrations of subsurface contaminants.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternative 1 would provide no short-term adverse impacts. Alternative 2 could present short-term adverse impacts due to dust generation during excavation activities. Suppression methods such as water or chemical dust suppressants would be applied to mitigate this risk. Workers could be

exposed to contaminated soils during excavation activities requiring the use of personal protective equipment. Alternatives 3 and 4 present the same potential short-term impacts as Alternative 2. The risks slightly increase with Alternative 3 due to the greater size of the excavation and increase again with Alternative 4, which would have the largest excavation. Dust suppression methods and community air monitoring would also be used with alternatives 3 and 4.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would only minimally reduces the long-term risk with the use of signs and fencing.

Alternative 2 would not reduce the volume or concentration of the contaminants. It would reduce the risk of further groundwater impacts somewhat by reducing infiltration. The asphalt would require maintenance in order to continue its effectiveness as a barrier to prevent exposures.

Alternative 3 would diminish the long-term risks to human health by the removal of contaminated surface soil and addition of a clean soil cover. This would reduce the risk of direct human contact. The impermeable cap and removal of the drywell would effectively prevent further groundwater contamination. An impermeable membrane cap would require little maintenance.

Alternative 4 would also diminish the long-term risks to human health by the removal of surface soil and the most contaminated subsurface soil, thereby reducing the potential for direct contact. The impermeable cap and removal of the drywell would effectively prevent further groundwater contamination. An impermeable membrane cap would require little maintenance.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 1 would do nothing to reduce the toxicity, mobility or volume of wastes at the site.

The drywell removal and pavement repair in Alternative 2 would somewhat reduce the mobility of the wastes in soils by reducing infiltration. Toxicity and volume would not be reduced.

Alternative 3 would reduce the mobility of the wastes by installation of an impermeable cap which would prevent infiltration of surface runoff. This infiltration is the primary means by which contaminants move through the soil to groundwater. The removal of contaminated surface soils would also reduce the total volume and toxicity of the waste, as some of the soil would require treatment at the disposal facility to reduce contaminant concentrations to levels acceptable for disposal in a controlled landfill.

Similar to Alternative 3, Alternative 4 would also reduce the mobility of the wastes by installation of an impermeable cap which would prevent infiltration of surface runoff. The removal of contaminated surface soils would also reduce the total volume and toxicity of the waste, as some of the soil would require treatment at the disposal facility to reduce contaminant concentrations to levels acceptable for disposal in a controlled landfill.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Both Alternatives 1 and 2 would be easily implemented, requiring only readily available equipment and personnel and minimal coordination for agency approvals.

Alternatives 3 and 4 would be somewhat more complicated requiring staging of soils to be removed, more equipment, specialized vendors, and agency approvals. Coordination would be required to minimize disturbance to neighboring residential areas. Nevertheless, the required vendors and equipment would be readily available and no major problems would be anticipated during the remedial activities.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 3.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative 3 as the remedy for this site. Alternative 3, excavation of all surface soil, drywell abandonment and associated surface runoff basin and drain installation, impermeable cap, and groundwater monitoring includes:

Excavation of the top 18 inches of soil over the entire parking lot in the rear of the Fumex building and all contaminated soils in the yard of an adjacent residence, disposal of the

excavated material to an off-site RCRA approved facility, backfill of excavated area with clean soil, abandonment and removal of the on-site drywell and replacement with a catch basin connected to a local storm drain, installation of an impermeable membrane cap, repaving parking lot with asphalt, power washing and sealing surfaces in the former garage area in the on-site building, and implementation of a groundwater monitoring program. This remedy would remove the most contaminated soil near the surface, thus preventing direct human contact. The catch basin and impermeable membrane cap would minimize the potential of the remaining contamination to impact groundwater quality.

This selection is based on the evaluation of the four alternatives developed for this site. Alternative 1 (no action) would not comply with the threshold criteria and thus was eliminated from further consideration. Alternative 2 (drain replacement and pavement repair) only partially met the threshold criteria, putting it at a disadvantage to Alternatives 3 and 4 which met the threshold criteria. Alternative 4 (surface and subsurface excavation and cap) would be similar to Alternative 3 in most balancing criteria except for cost. The removal of surface soils and the most contaminated subsurface soils in Alternative 4 would be only slightly more protective than Alternative 3. This is because the subsurface contamination remaining in either Alternative 3 or Alternative 4 would be isolated by the impermeable cap. The impermeable cap would reduce the threat to groundwater and, along with the asphalt and clean backfill material at the surface, would isolate the waste from human contact. The slight increase in protection provided by Alternative 4 cannot justify the nearly 2.5 times increase in cost over Alternative 3.

The estimated present worth cost to implement the remedy is $ 628,000. The cost to construct the remedy is estimated to be $464,000 and the estimated average annual operation and maintenance cost for 30 years is $ 10,700.

The elements of the proposed remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved;

2. Excavation of the top 18 inches of soil layer over the entire parking lot area;

3. Removal, of the contaminated surface soil at the adjacent residence. The volume of the soil to be removed would be determined during design. Confirmatory sampling would be conducted to verify that all soil contaminated with over 1400 ppm of chlordane is removed;

4. Disposal of the excavated material to an off-site RCRA-approved facility;

5. Installation of an impermeable membrane cap over the entire parking lot area;

6. Backfill of excavated areas with clean soil and repave parking lot with asphalt;

7. Abandonment and removal of the on-site drywell and some additional soils immediately beneath the drywell to the extent practical;

8. Installation of a catch basin in place of the drywell;

9. Installation of a reinforced concrete pipe drain from the new catch basin to a local storm drain;

10. The concrete floor in the former garage area of the on-site building would be power washed with detergent and the washwater would be collected and properly disposed of;

11. A deed restriction to maintain the impermeable cap and restrict any soil excavation beneath the impermeable cap without prior approval granted by the NYSDEC;

12. A long term inspection and maintenance program for the cap; and

13. Since the remedy results in untreated hazardous waste remaining at the site, a long-term monitoring program would be instituted. This monitoring program would consist of the semi-annual sampling and analysis of groundwater from one shallow and one deep on-site groundwater monitoring well immediately downgradient of the current on-site drywell location, two off-site groundwater wells immediately downgradient of the site and one upgradient, background monitoring well. This program would allow the effectiveness of the impermeable cap to be monitored and would be a component of the operation and maintenance for the site.

Table 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
Alt. 1 - No Action, Groundwater Monitoring	$14,800	$7,900	$136,000
Alt. 2 - Drywell Abandonment, Asphalt Repair	$140,000	$10,000	$294,000
Alt. 3 - Surface Soil Removal, Drywell Abandonment, Impermeable Cap	$464,000	$10,700	$628,000
Alt. 4 - Surface Soil Removal, Drywell Trench Soil Removal, Drywell Abandonment, Impermeable Cap	$1,238,000	$10,200	$1,395,000